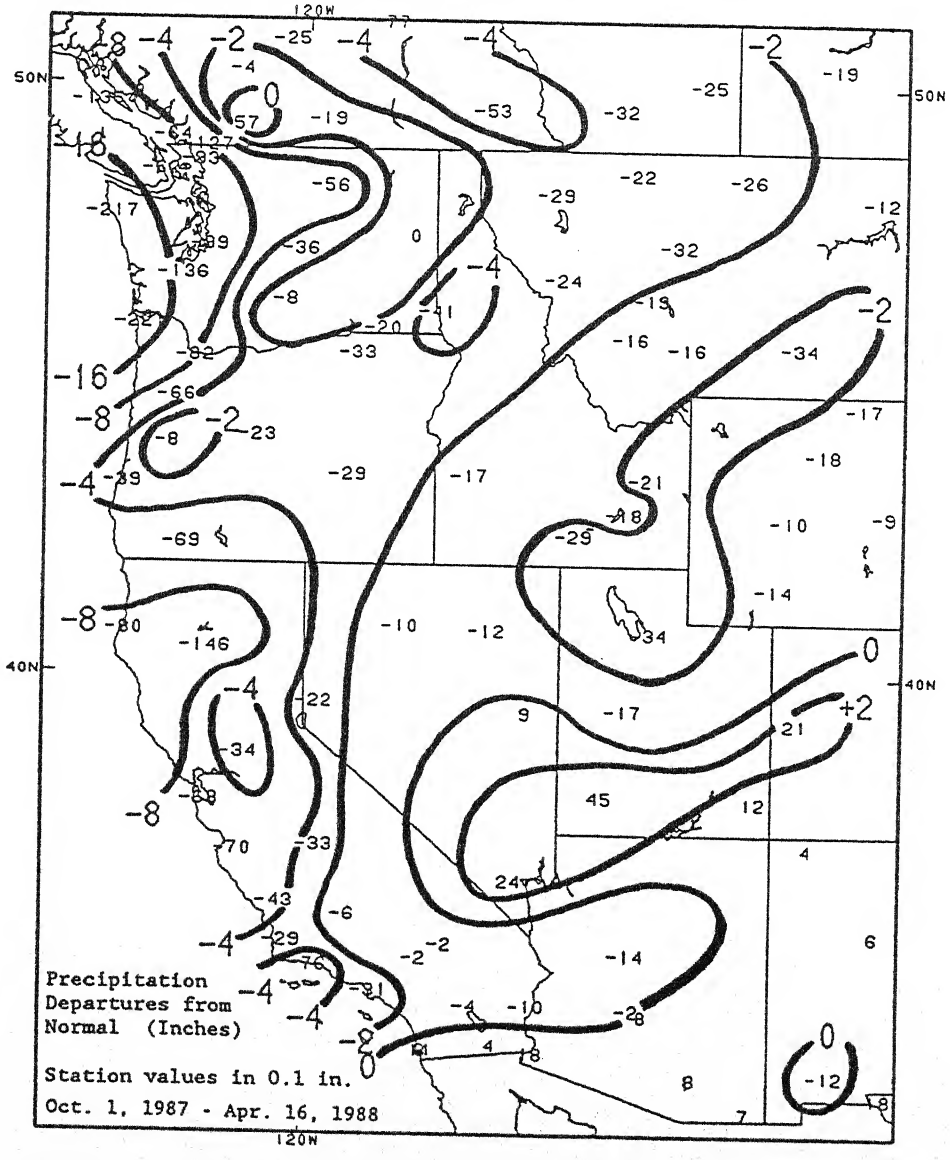
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 88/16 Washington, DC April 16, 1988



AS THE RAINY SEASON NORMALLY DIMINISHES IN APRIL, THE PROSPECT FOR SIGNIFICANT PRECIPITATION TO MARKEDLY REDUCE THE WEST'S LARGE DEFICIENCIES (SINCE OCTOBER 1, 1987) APPEARS UNLIKELY. REFER TO THE SPECIAL CLIMATE SUMMARIES UPDATING THE UNUSUALLY DRY CONDITIONS IN BOTH THE WESTERN AND SOUTHEASTERN UNITED STATES.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

Highlights of major global climatic events and anomalies.
U.S. climatic conditions for the previous week.
U.S. apparent temperatures (summer) or wind chill (winter).
Global two-week temperature anomalies.
Global four-week precipitation anomalies.
Global monthly temperature and precipitation anomalies.
Global three-month precipitation anomalies (once a month).
Global twelve-month precipitation anomalies (every 3 months).
Global temperature anomalies for winter and summer seasons.
Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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Climate Analysis Center, W/NMC53
Attention: Weekly Climate Bulletin
NOAA, National Weather Service
Washington, DC 20233
Phone: (301)-763-8071

GLOBAL HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF APRIL 16, 1988
(Approximate duration of anomalies is in brackets.)

1. Western United States:

COASTAL RAINS EASE DRYNESS.

Up to 25.2 mm (0.99 inch) of rain fell at coastal California stations and provided some relief from persistent dryness in the region [13 weeks]. See Special Summary attached.

2. Southeastern United States:

MUCH NEEDED RAINS OCCUR.

As much as 75.7 mm (2.98 inches) of rain was reported at stations in the southeastern United States; however, the area continues to be abnormally dry [11 weeks]. See Special Summary attached.

3. North Central United States:

UNUSUALLY DRY CONDITIONS PREVAIL.

Little or no precipitation was recorded in Wyoming and the Dakotas where dryness remains [5 weeks].

4. Europe:

CENTRAL EUROPE REMAINS WET.

Moderate precipitation, up to 69.2 mm (2.72 inches) in Austria, was measured across much of Switzerland, Austria, and southern West Germany [12 weeks].

5. Brazil:

TEMPERATURES REMAIN ABOVE NORMAL.

Temperatures reached up to 3.1°C (5.6°F) above normal across much of west central Brazil [6 weeks].

6. Australia:

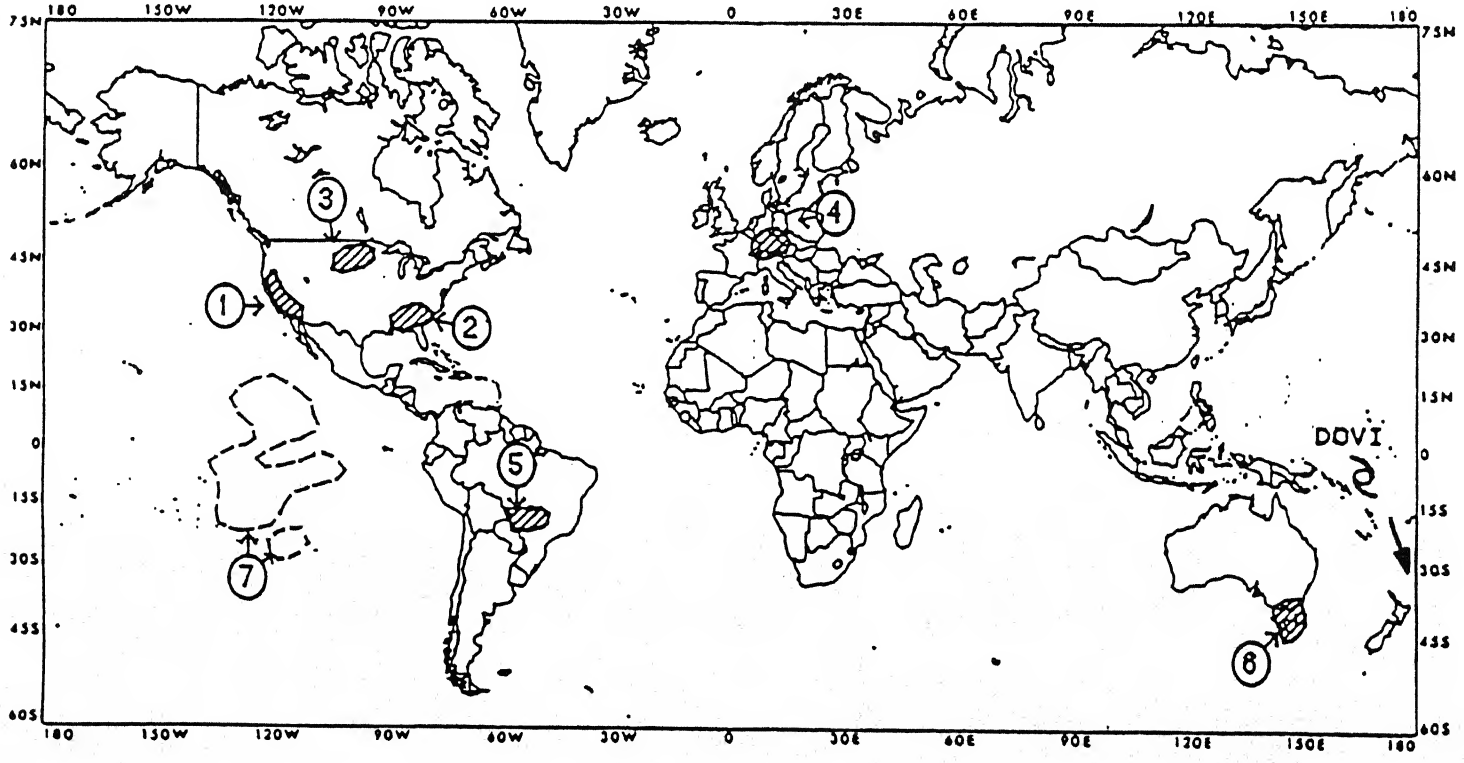
VICTORIA AND TASMANIA ARE VERY DRY.

Little or no precipitation, 7.0 mm (0.28 inches) or less, was reported in southeastern Australia as the autumn rains have been delayed [5 weeks].

7. Central and Eastern Tropical Pacific:

REFER TO MARCH 1988 EL NINO/SOUTHERN OSCILLATION (ENSO) ADVISORY.

The areas of positive sea surface temperature anomalies above 1°C (1.8°F) have greatly diminished over the past few months. Regions above 1°C (1.8°F) during March 1988 are outlined.



Approximate locations of the major anomalies and events described above are shown on this map. See the other world maps in this Bulletin for current two-week temperature anomalies, four-week precipitation anomalies, and (occasionally) longer-term anomalies.

U.S. WEEKLY WEATHER HIGHLIGHTS

FOR THE WEEK OF APRIL 10 THROUGH APRIL 16, 1988

Two different storm systems affected various portions of the southwestern and southeastern U.S. Early in the week, a developing low pressure center brought moderate to heavy rainfall across much of the Southeast, especially in the areas that have been abnormally dry since late January (see Weekly Climate Bulletin dated 3/26/88), while snow accumulated in the higher elevations of the southern Appalachians. As the center strengthened off the Atlantic coast, the eastern Carolinas received substantial precipitation (see Table 1). In the West and Southwest, the first significant rains in over a month fell on California and Oregon, but most weekly totals were under an inch. At the week's end, however, the storm had intensified and was moving into the Southeast. Light to moderate precipitation occurred from coastal Washington southeastwards into western Texas, from Oklahoma eastward to the Carolinas, and across the Great Lakes and New England regions. The northern Rockies, Great Plains, upper Midwest, parts of the Gulf Coast, southern Florida, and from Iowa eastward to Delaware reported little or no precipitation last week.

Cooler weather dominated much of the eastern two-thirds of the nation. Largest departures below normal (between -6 to -9°F) were located in the central Great Plains, southern Texas, Florida, and along the Delaware, Virginia, and North Carolina coasts (see Table 3). The freezing line extended southward into the western Carolinas, Tennessee, and Arkansas (see Figure 1), while some stations in southern Texas established daily record low temperatures earlier in the week. In contrast, warm conditions covered the western U.S., especially in the Pacific Northwest interior and the northern Rockies. Departures of +10 to +15°F were common in the western halves of Montana and Wyoming, Idaho, and the eastern halves of Washington and Oregon (see Table 2). During the first half of the week, several locations in the West set new daily record maximum temperatures as the 80°F isotherm extended into southern British Columbia, while readings over 90°F were measured in much of California. In Alaska, the bitterly cold weather of previous weeks was replaced by unseasonably mild conditions.

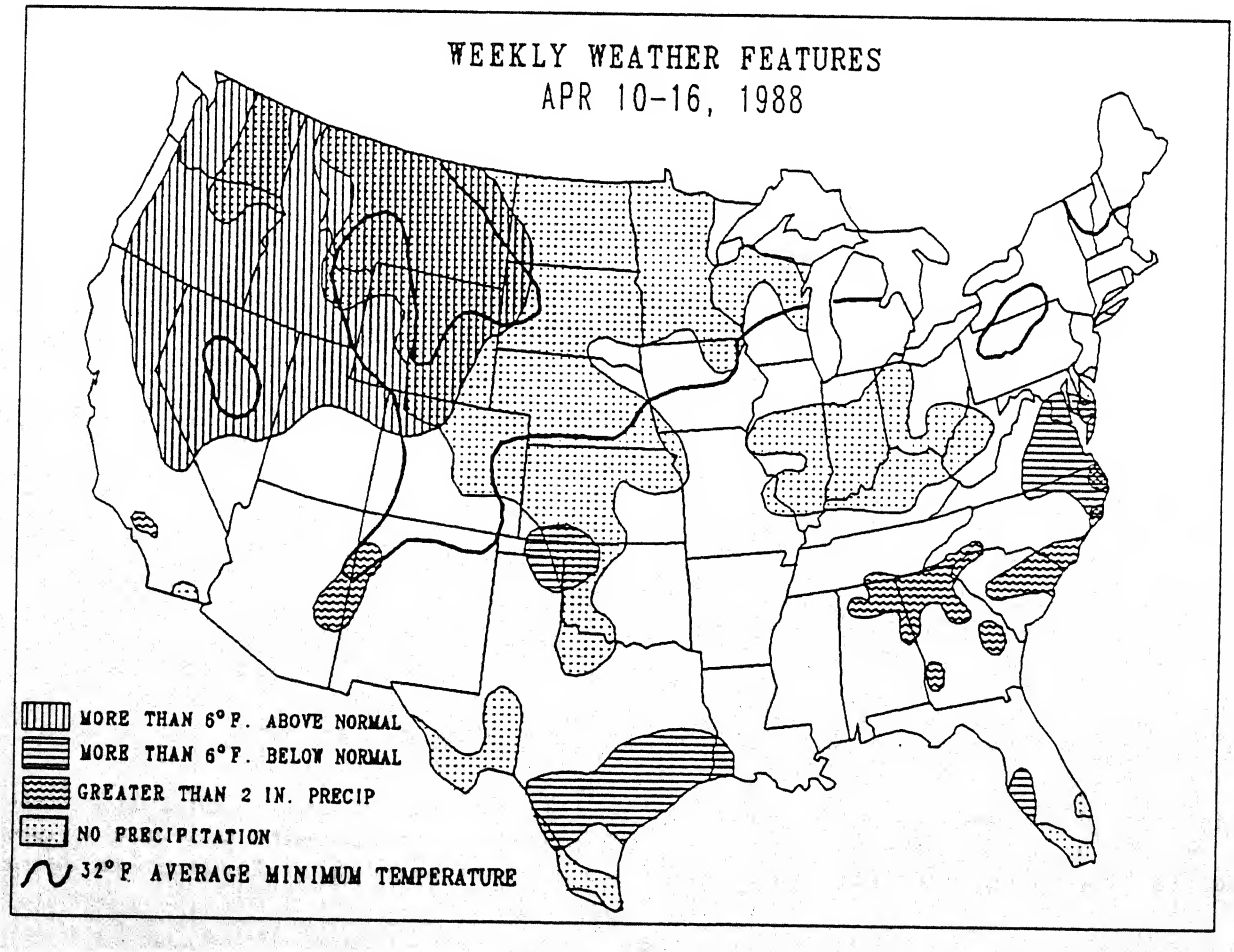


TABLE 1. Selected stations with two or more inches of precipitation for the week.

Homer, AK	3.19	New Bern, NC	2.52
Cordova, AK	3.09	Cherry Point, NC	2.41
Kodiak, AK	3.04	Gallup, NM	2.37
Myrtle Beach AFB, SC	2.98	Wilmington, NC	2.23
Yakutat, AK	2.94	Valdez, AK	2.15
Mt. Washington, NH	2.68	Sumter/Shaw AFB, SC	2.00
Florence, SC	2.55		

TABLE 2. Selected stations with temperatures averaging greater than 11°F ABOVE normal for the week.

Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Redmond, OR	+15	58	Spokane, WA	+13	58
Cut Bank, MT	+14	52	Boise, ID	+12	61
Kalispell, MT	+14	57	Burley, ID	+12	58
Omak, WA	+14	62	Butte, MT	+12	49
Lewiston, ID	+13	63	Lewiston, MT	+12	51
Missoula, MT	+13	57	Lander, WY	+12	54
Meacham, OR	+13	53			

TABLE 3. Selected stations with temperatures averaging greater than 6°F BELOW normal for the week.

Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Hampton/Langley AFB, VA	-9	48	Gage, OK	-7	50
Norfolk, VA	-9	49	Beaumont, TX	-7	62
Cape Hatteras, NC	-8	51	Corpus Christi, TX	-7	66
Victoria, TX	-8	63	Houston, TX	-7	62
Washington/National, DC	-7	49	Palacios, TX	-7	62
Dover AFB, DE	-7	46	Richmond, VA	-7	50
Baltimore, MD	-7	47			

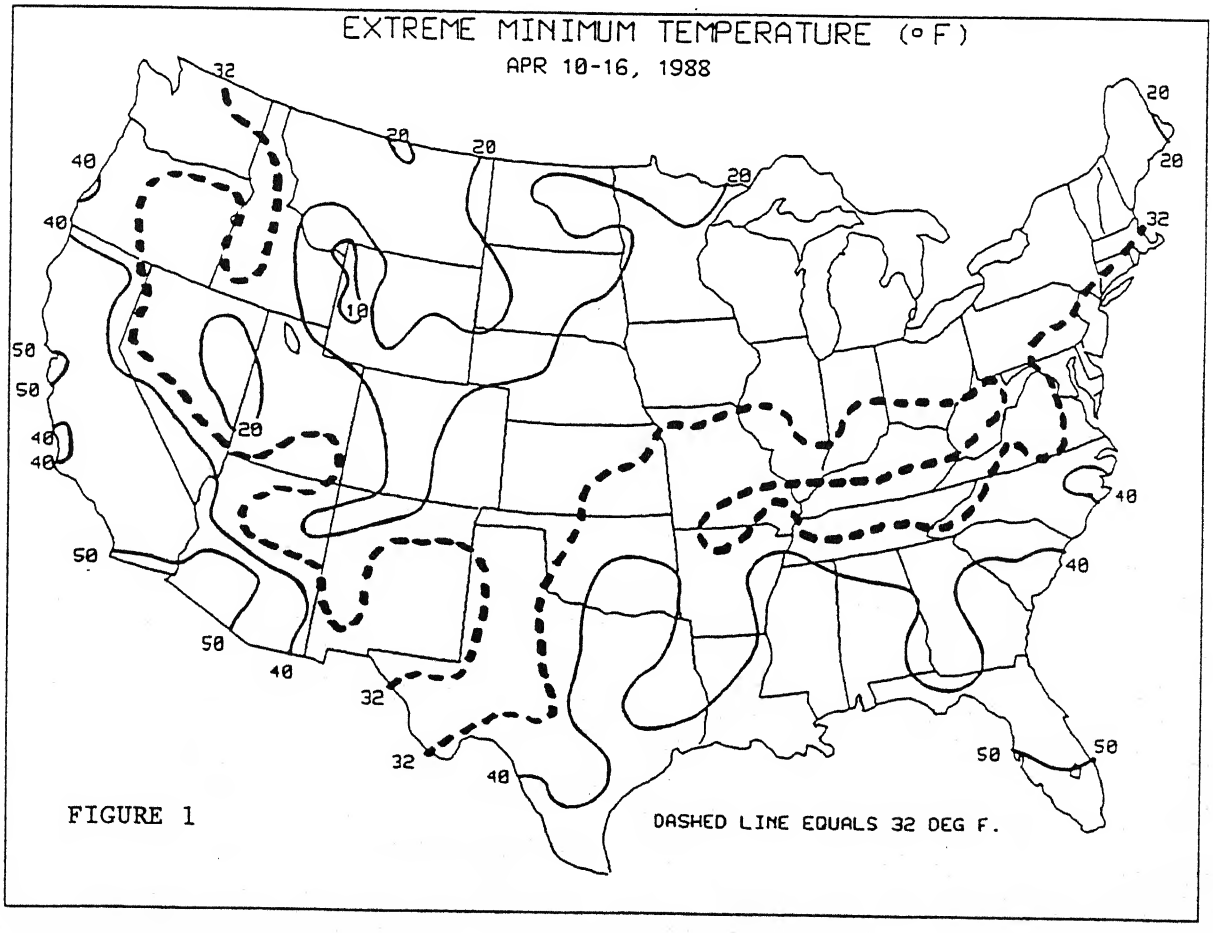
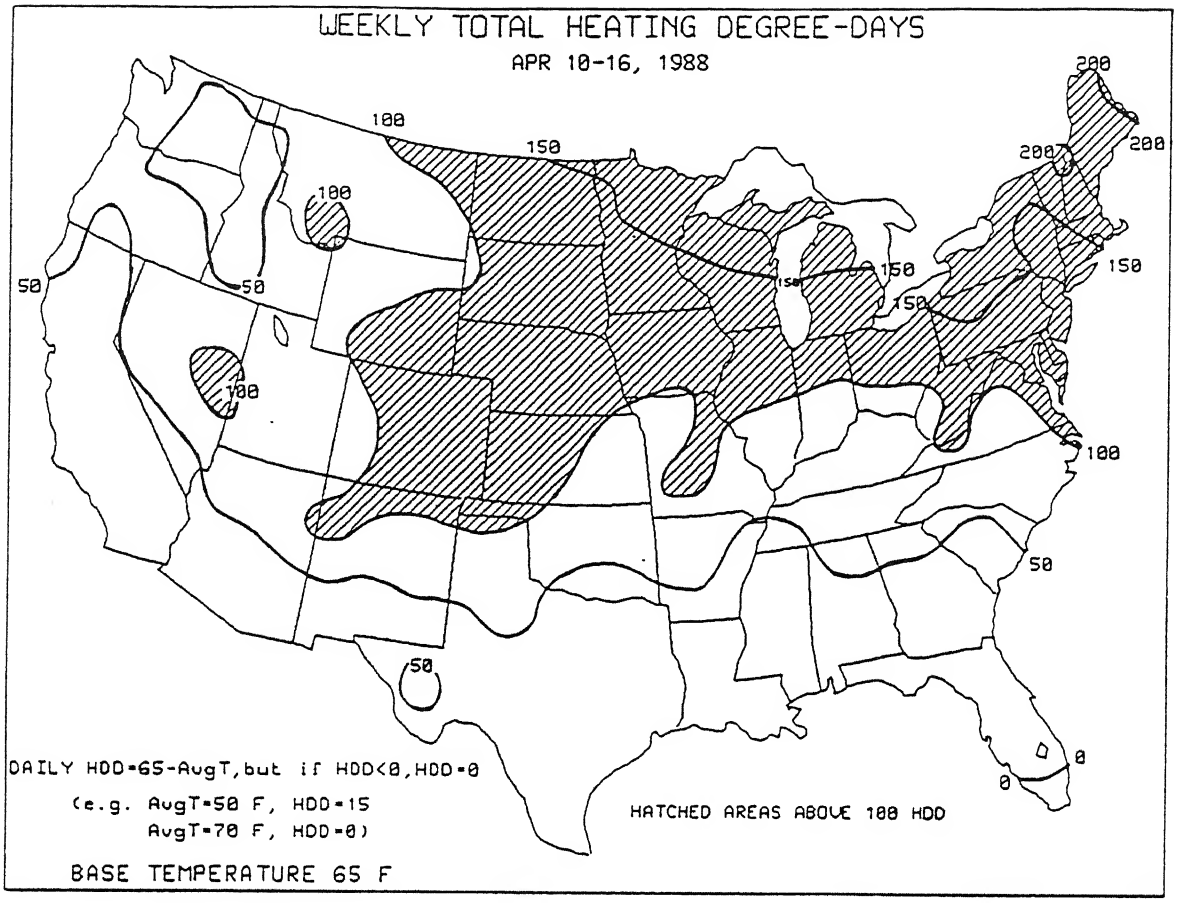
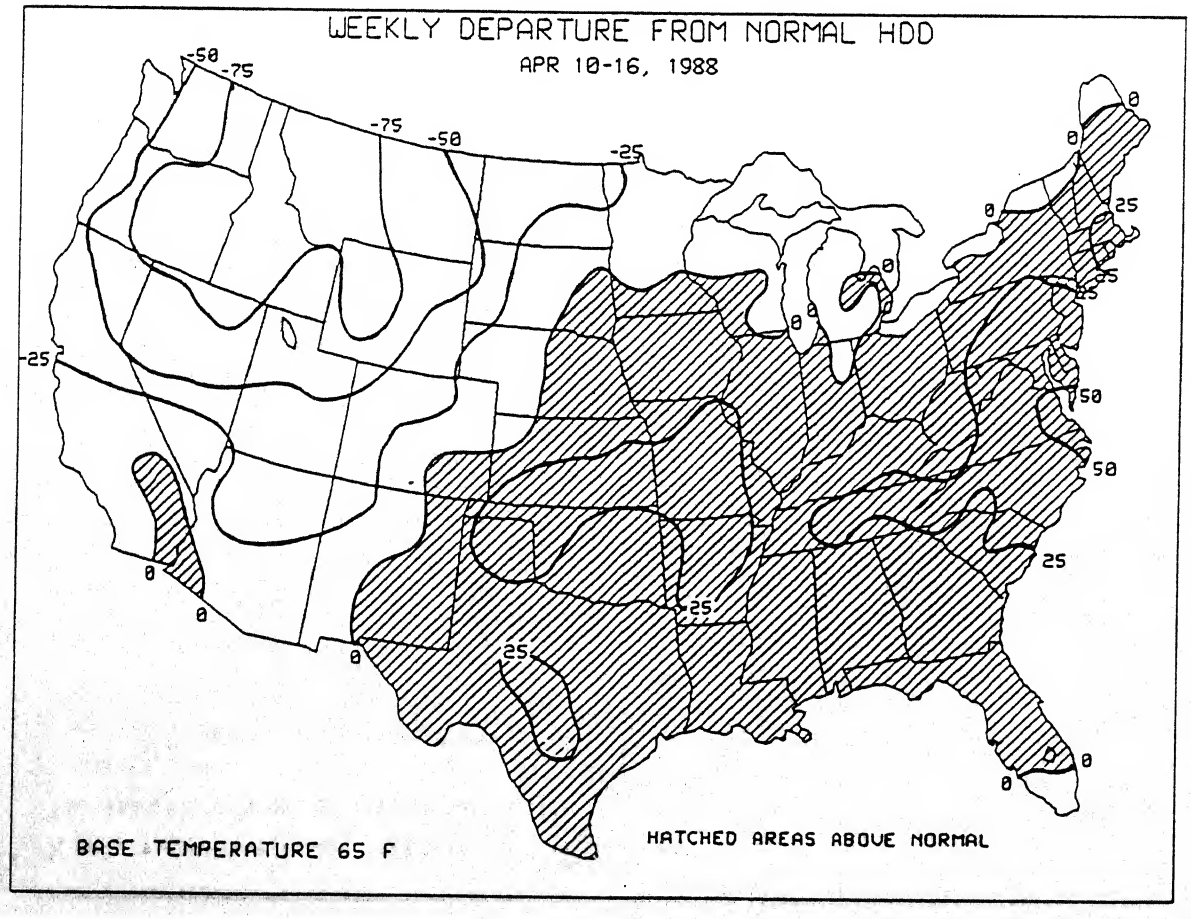


FIGURE 1

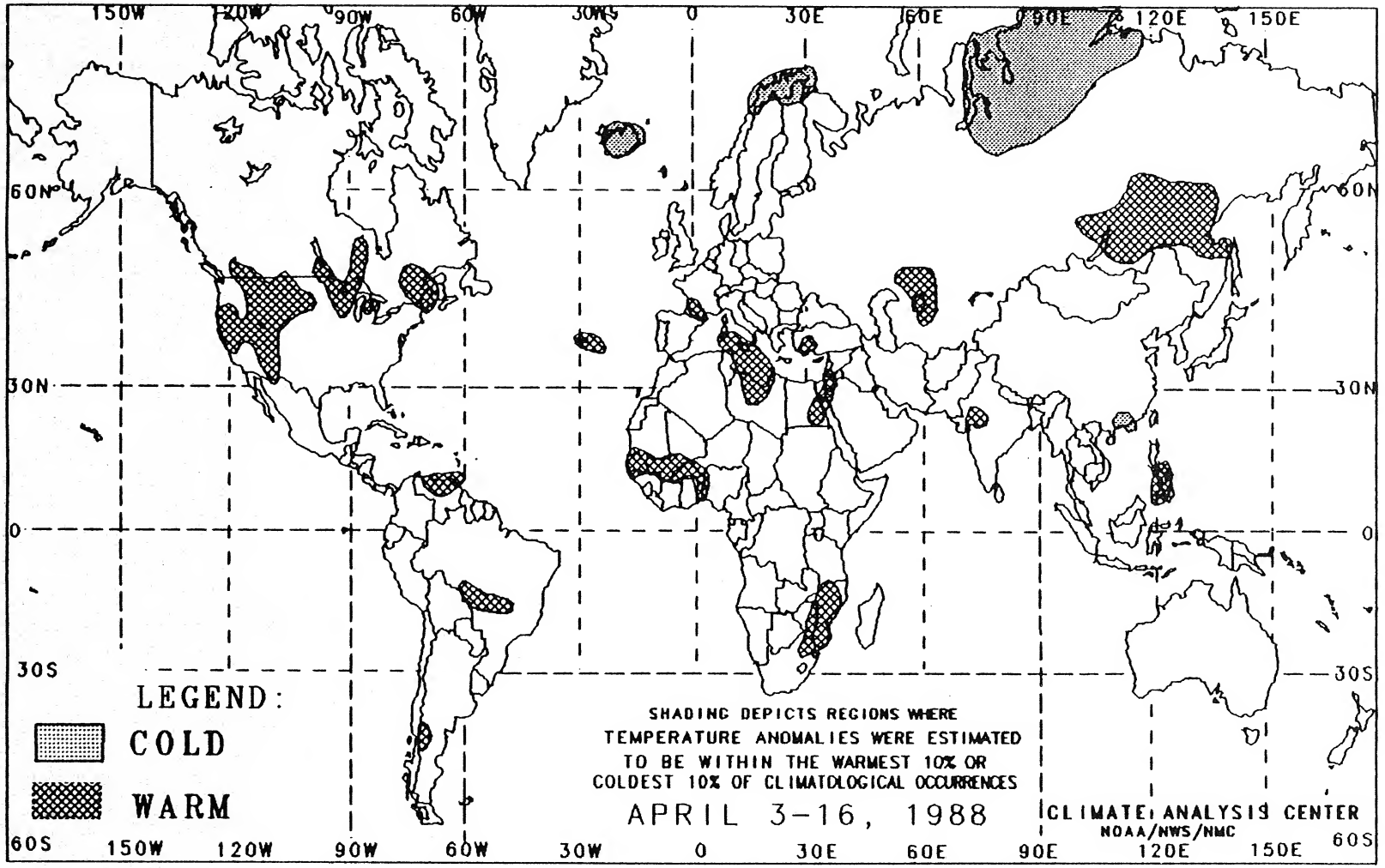


Refer to last week's issue (dated 4/9/88) for explanations of both charts.



GLOBAL TEMPERATURE ANOMALIES

2 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

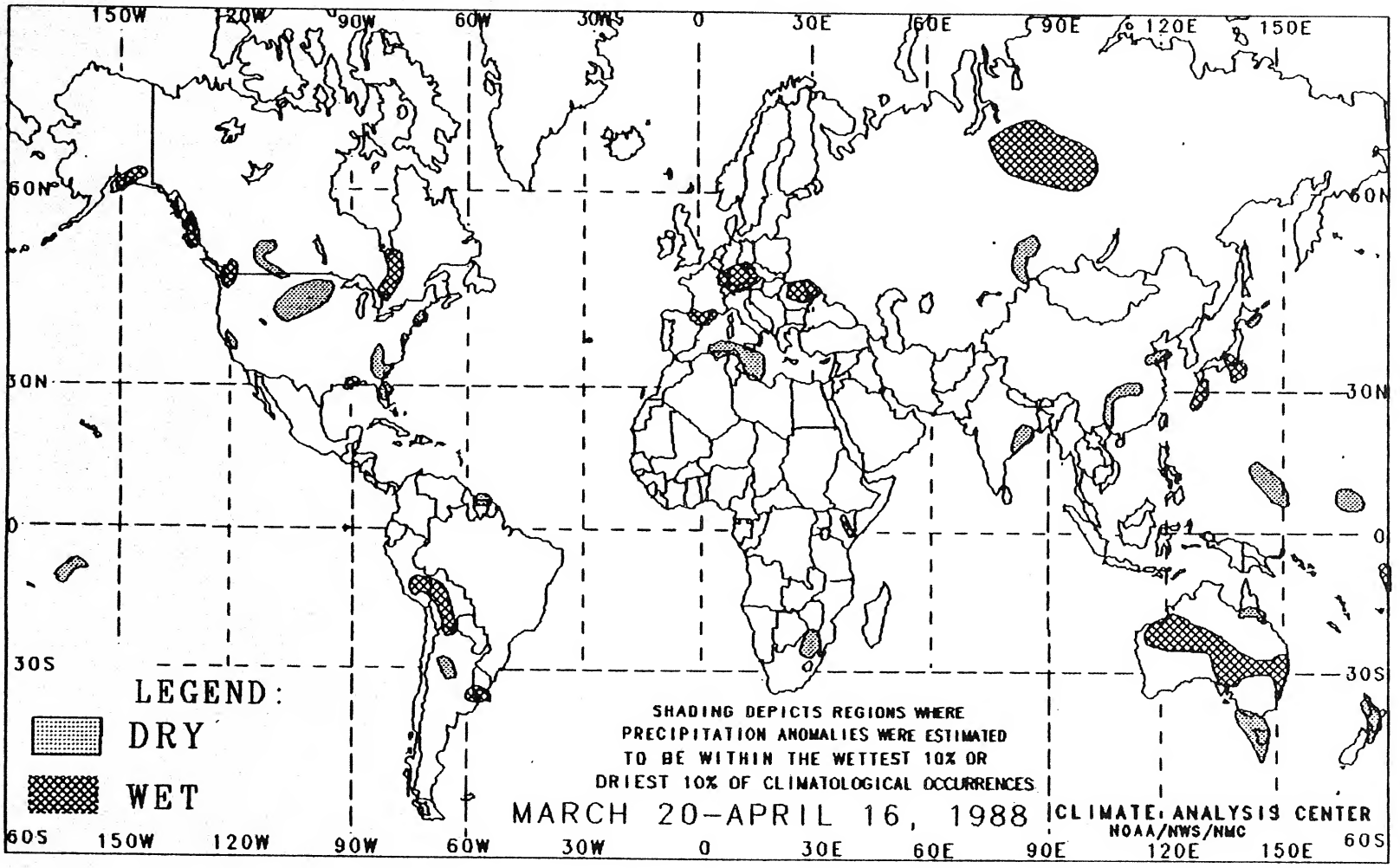
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining precentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

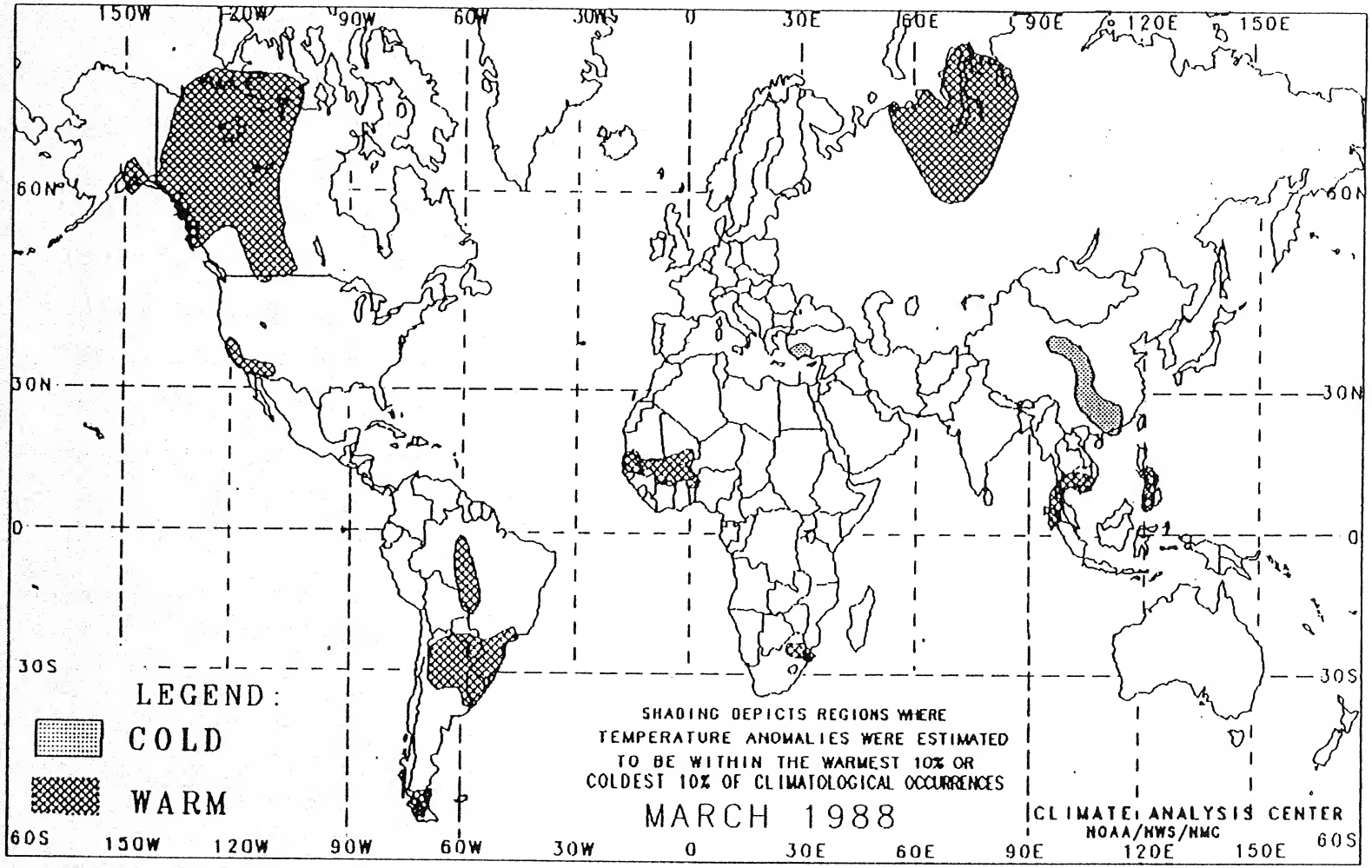
In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL TEMPERATURE ANOMALIES

Monthly



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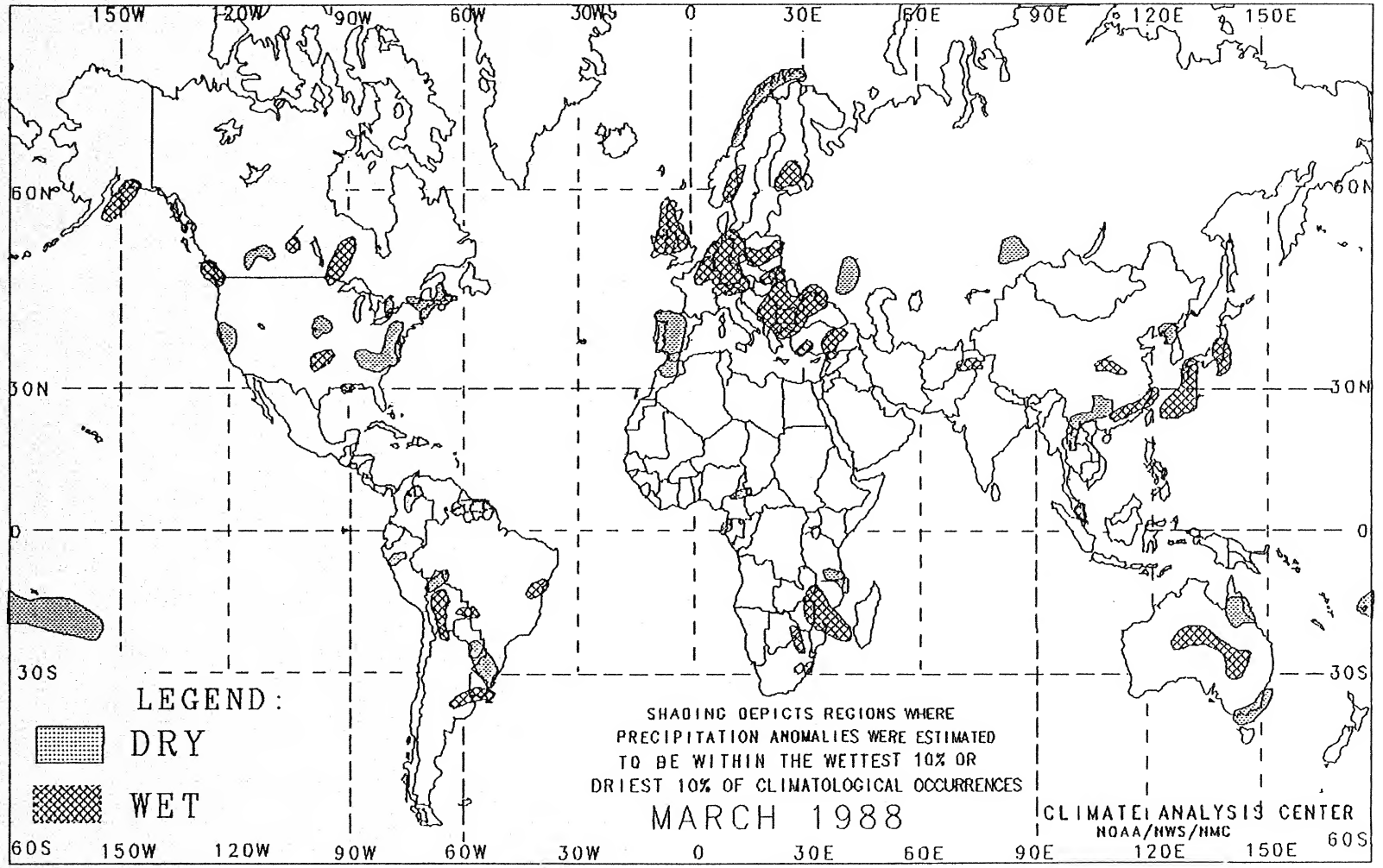
The chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRINCIPAL TEMPERATURE ANOMALIES — MARCH 1988

REGIONS AFFECTED	TEMPERATURE AVERAGE (C)	DEPARTURE FROM NORMAL (C)	COMMENTS
WESTERN CANADA AND ADJACENT PARTS OF ALASKA AND MONTANA	-32 TO +5	+2 TO +9	MILD - 3 TO 8 WEEKS
CALIFORNIA AND ARIZONA	+13 TO +20	+2 TO +3	WARM - 4 TO 6 WEEKS
WEST CENTRAL BRAZIL	+24 TO +29	+2 TO +4	WARM - 4 TO 7 WEEKS
SOUTHERN BRAZIL, NORTHERN ARGENTINA, PARAGUAY, AND URUGUAY	+21 TO +29	+2 TO +5	WARM - 2 TO 6 WEEKS
EXTREME SOUTHERN ARGENTINA AND ADJACENT PARTS OF CHILE	+10 TO +16	+2 TO +3	VERY MILD MIDDLE OF MARCH
SOUTHWESTERN TURKEY	+4 TO +10	-2 TO -3	VERY COOL EARLY IN MARCH
SAHEL REGION	+26 TO +33	+2 TO +3	WARM - 2 TO 7 WEEKS
NORTHEASTERN SOUTH AFRICA	+20 TO +22	AROUND +2	WARM - 6 TO 13 WEEKS
NORTHWESTERN SIBERIA	-21 TO -3	+4 TO +8	MILD - 4 WEEKS
CHINA	-1 TO +14	-2 TO -5	COLD - 2 TO 6 WEEKS
THAILAND, MALAYSIA, VIETNAM, AND SUMATRA	+28 TO +31	AROUND +2	WARM - 3 TO 6 WEEKS
PHILIPPINES	+29 TO +30	+2 TO +3	WARM - 20 WEEKS

GLOBAL PRECIPITATION ANOMALIES

Monthly



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In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

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The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

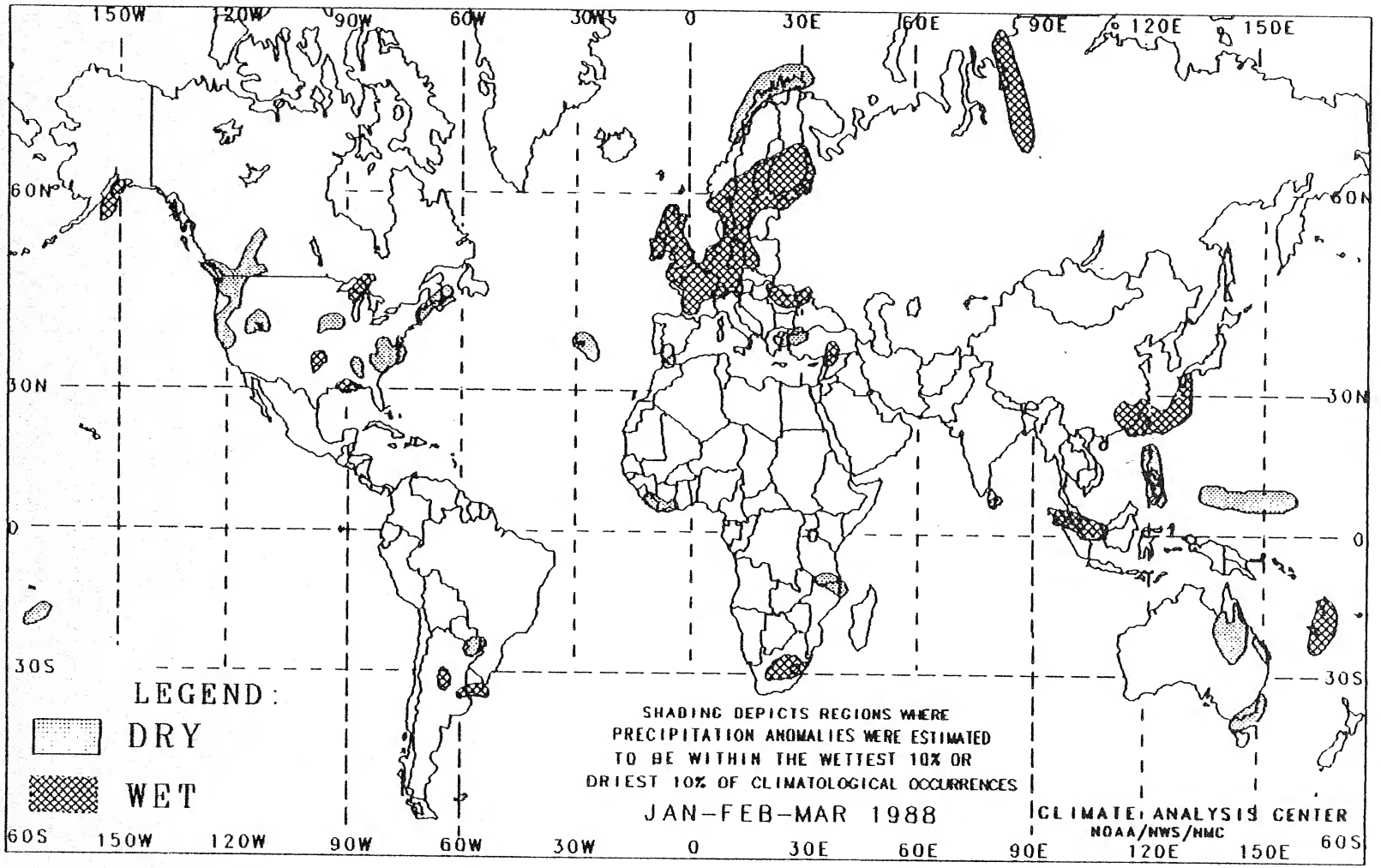
PRINCIPAL PRECIPITATION ANOMALIES — MARCH 1988

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
SOUTHEASTERN ALASKA	106 TO 239	219 TO 324	HEAVY PRECIPITATION FIRST HALF OF MARCH
VANCOUVER ISLAND	123 TO 324	173 TO 207	HEAVY PRECIPITATION LATE IN MARCH
SOUTHEASTERN BRITISH COLUMBIA AND SOUTHWESTERN ALBERTA	0 TO 141	0 TO 48	DRY - 11 TO 29 WEEKS
SOUTHERN SASKATCHEWAN	44 TO 67	208 TO 297	HEAVY PRECIPITATION LATE IN MARCH
SOUTHWESTERN ONTARIO	64 TO 101	190 TO 673	WET - 6 TO 11 WEEKS
SOUTHEASTERN ONTARIO	0 TO 32	0 TO 46	DRY - 4 WEEKS
NEW ENGLAND AND SOUTHEASTERN CANADA	0 TO 48	0 TO 49	DRY - 4 TO 7 WEEKS
CALIFORNIA	1 TO 30	2 TO 48	DRY - 4 TO 11 WEEKS
NEBRASKA	2 TO 6	4 TO 14	DRY - 8 WEEKS
OKLAHOMA AND TEXAS	94 TO 199	209 TO 377	WET - 4 TO 8 WEEKS
SOUTHEASTERN LOUISIANA	160 TO 226	189 TO 200	WET - 4 TO 9 WEEKS
SOUTHEASTERN UNITED STATES	22 TO 78	24 TO 61	DRY - 8 TO 11 WEEKS
SOUTH PACIFIC ISLANDS	8 TO 185	3 TO 48	DRY - 4 TO 8 WEEKS
COLOMBIA	1 TO 47	3 TO 48	DRY - 4 WEEKS
GUYANA, SURINAME, AND EASTERN VENEZUELA	2 TO 48	7 TO 45	DRY - 6 TO 6 WEEKS
NORTHWESTERN PERU	0 TO 18	0 TO 12	DRY - 6 WEEKS
NORTHERN BOLIVIA	AROUND 76	AROUND 28	DRY - 7 TO 11 WEEKS
WESTERN BOLIVIA AND ADJACENT PARTS OF ARGENTINA	108 TO 502	197 TO 446	WET - 4 TO 7 WEEKS
EASTERN BOLIVIA AND ADJACENT PARTS OF BRAZIL	219 TO 265	170 TO 242	WET - 7 WEEKS
EASTERN BRAZIL	240 TO 281	183 TO 221	WET - 6 WEEKS
SOUTHERN PARAGUAY AND SOUTHERN BRAZIL	1 TO 113	3 TO 46	DRY - 6 TO 9 WEEKS
SOUTHERN URUGUAY AND EAST CENTRAL ARGENTINA	189 TO 686	218 TO 603	WET - 4 TO 6 WEEKS
IRELAND AND GREAT BRITAIN	81 TO 148	174 TO 261	HEAVY PRECIPITATION MIDDLE OF MARCH
NORTHERN NORWAY	6 TO 31	11 TO 49	DRY - 10 TO 11 WEEKS
SOUTHEASTERN NORWAY	79 TO 199	209 TO 770	WET - 4 TO 6 WEEKS
SOUTHERN FINLAND	46 TO 71	186 TO 412	WET - 4 TO 14 WEEKS

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
CENTRAL EUROPE	44 TO 673	187 TO 463	WET - 8 TO 14 WEEKS
SOUTHEASTERN EUROPE	60 TO 189	204 TO 404	WET - 4 TO 6 WEEKS
UKRAINIAN S.S.R.	7 TO 14	20 TO 47	DRY - 4 WEEKS
SPAIN AND MOROCCO	0 TO 48	0 TO 49	DRY - 4 TO 6 WEEKS
SOUTHWESTERN TURKEY	121 TO 266	214 TO 221	HEAVY PRECIPITATION FIRST HALF OF MARCH
EASTERN TURKEY AND NORTHERN SYRIA	71 TO 168	174 TO 223	HEAVY PRECIPITATION FIRST HALF OF MARCH
CAMEROON	1 TO 31	3 TO 37	DRY - 4 WEEKS
GABON	464 TO 669	163 TO 163	HEAVY PRECIPITATION MIDDLE OF MARCH
SOUTHERN TANZANIA AND NORTHERN MOZAMBIQUE	68 TO 129	32 TO 61	DRY - 4 TO 7 WEEKS
CENTRAL MOZAMBIQUE AND EASTERN ZIMBABWE	166 TO 606	192 TO 279	HEAVY PRECIPITATION MIDDLE OF MARCH
EASTERN BOTSWANA AND NORTHERN SOUTH AFRICA	77 TO 132	177 TO 456	WET - 8 TO 10 WEEKS
SOUTHEASTERN SOUTH AFRICA	291 TO 313	206 TO 249	WET - 8 TO 10 WEEKS
NORTHEASTERN KAZAKH S.S.R.	0 TO 16	0 TO 49	DRY - 4 TO 6 WEEKS
NORTHERN PAKISTAN AND NORTHERN INDIA	169 TO 198	189 TO 243	WET - 5 TO 7 WEEKS
CENTRAL CHINA	64 TO 116	177 TO 302	WET - 5 TO 8 WEEKS
NORTH KOREA AND ADJACENT PARTS OF CHINA	0 TO 21	0 TO 46	DRY - 4 TO 6 WEEKS
SOUTHERN CHINA AND THAILAND	1 TO 49	1 TO 38	DRY - 4 TO 7 WEEKS
SOUTHEASTERN CHINA	169 TO 376	164 TO 224	WET - 4 TO 6 WEEKS
WESTERN JAPAN AND RYUKYU ISLANDS	170 TO 270	187 TO 203	HEAVY PRECIPITATION LATE IN MARCH
CENTRAL JAPAN	66 TO 376	160 TO 232	HEAVY PRECIPITATION LATE IN MARCH
SOUTHERN MALAYSIA	336 TO 689	147 TO 366	HEAVY PRECIPITATION EARLY IN MARCH
NORTHEASTERN AUSTRALIA	0 TO 176	0 TO 43	DRY - 8 TO 10 WEEKS
CENTRAL AUSTRALIA	62 TO 222	270 TO 700	HEAVY PRECIPITATION LATE IN MARCH
SOUTHEASTERN AUSTRALIA	14 TO 60	12 TO 60	DRY - 8 TO 10 WEEKS

GLOBAL PRECIPITATION ANOMALIES

3 Month



The anomalies on this chart are based on approximately 2500 observing stations for which at least 81 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the three month period is less than 50 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total three month precipitation exceeds 125 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

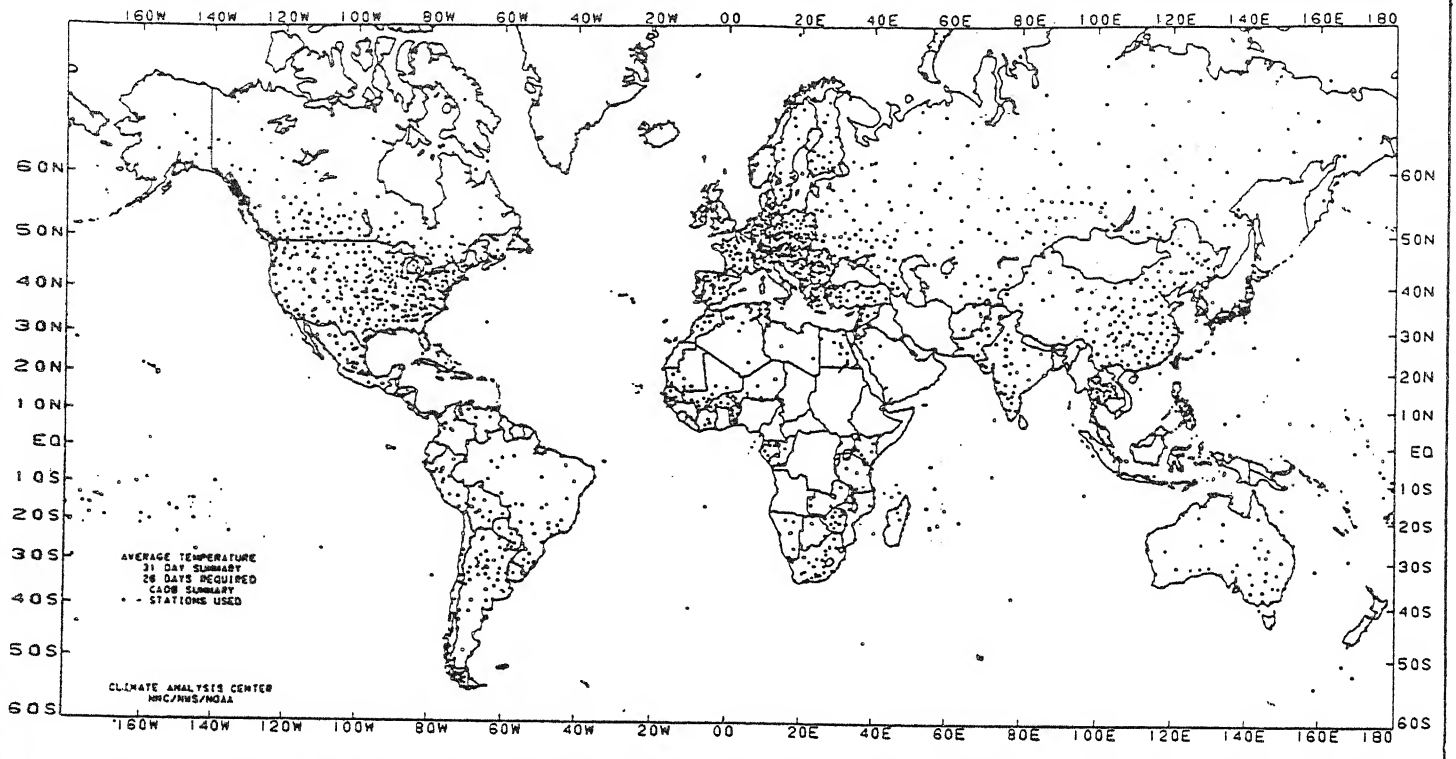


FIGURE 1. Stations used for AVERAGE TEMPERATURE anomaly analyses during March, 1988.

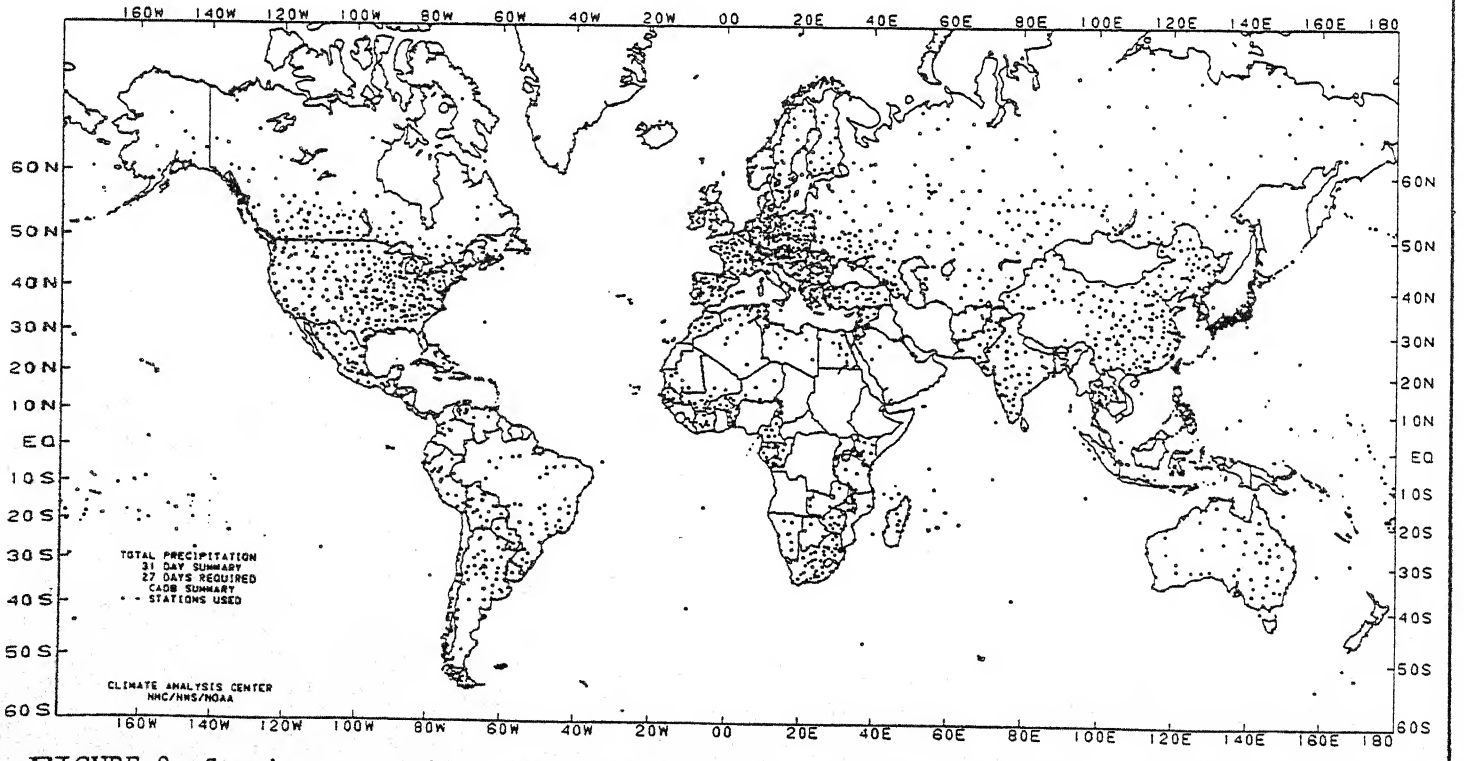


FIGURE 2. Stations used for TOTAL PRECIPITATION anomaly analyses during March, 1988.

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC
National Weather Service, NOAA

LARGE PRECIPITATION DEFICIENCIES EXIST AT MOST LOCATIONS IN THE WEST AS THE RAINY SEASON NORMALLY DRAWS TO AN END IN THE EARLY SPRING.

Even though many locations recorded under an inch, last week's rainfall in California was the first significant precipitation in the state since late February. Normally, most of the West receives the majority of their annual precipitation during the winter months (December-February), although significant precipitation may also fall during the transitional months of autumn (October and November) and spring (March and April). Since October 1, 1987, the West has measured well below normal precipitation, except in extreme southern California, coastal Oregon, eastern Washington, and the northern Cascades (see Figure 1). Most of these areas, however, have obtained the bulk of their precipitation early in the season.

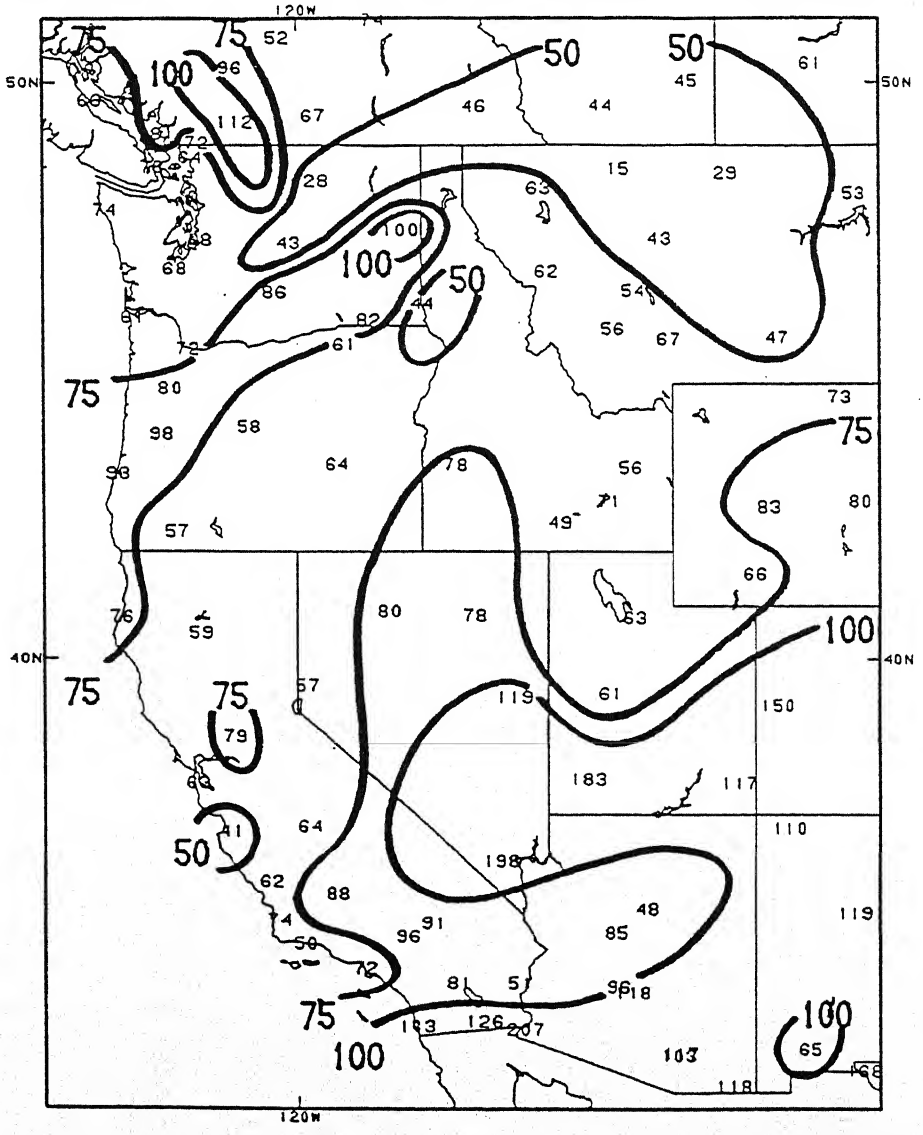


FIGURE 1. Percent of normal precipitation during Oct. 1, 1987 - Apr. 16, 1988. Only parts of the Southwest and northern Cascades were above normal for the period.

Lowest seasonal percentages of normal precipitation (near 50%) were located in northern California, eastern Oregon, western Washington, and the northern Rockies, while the largest seasonal departures from normal (between -8 to -22 inches) included coastal sections of Washington, Oregon, and northern California (see front cover). Using values from the most recent long-term Palmer Drought Index (explained on page 10 in the Weekly Climate Bulletin dated 3/26/88), the additional precipitation needed to bring the Palmer near zero (normal soil moisture conditions) ranged from 1.5 inches in southern Washington up to 14.9 inches in north-central California (see Figure 2). With the approach of the normally dry summer months, the best chances for significant precipitation to ease the long-term dryness may have to wait until next year's rainy season.

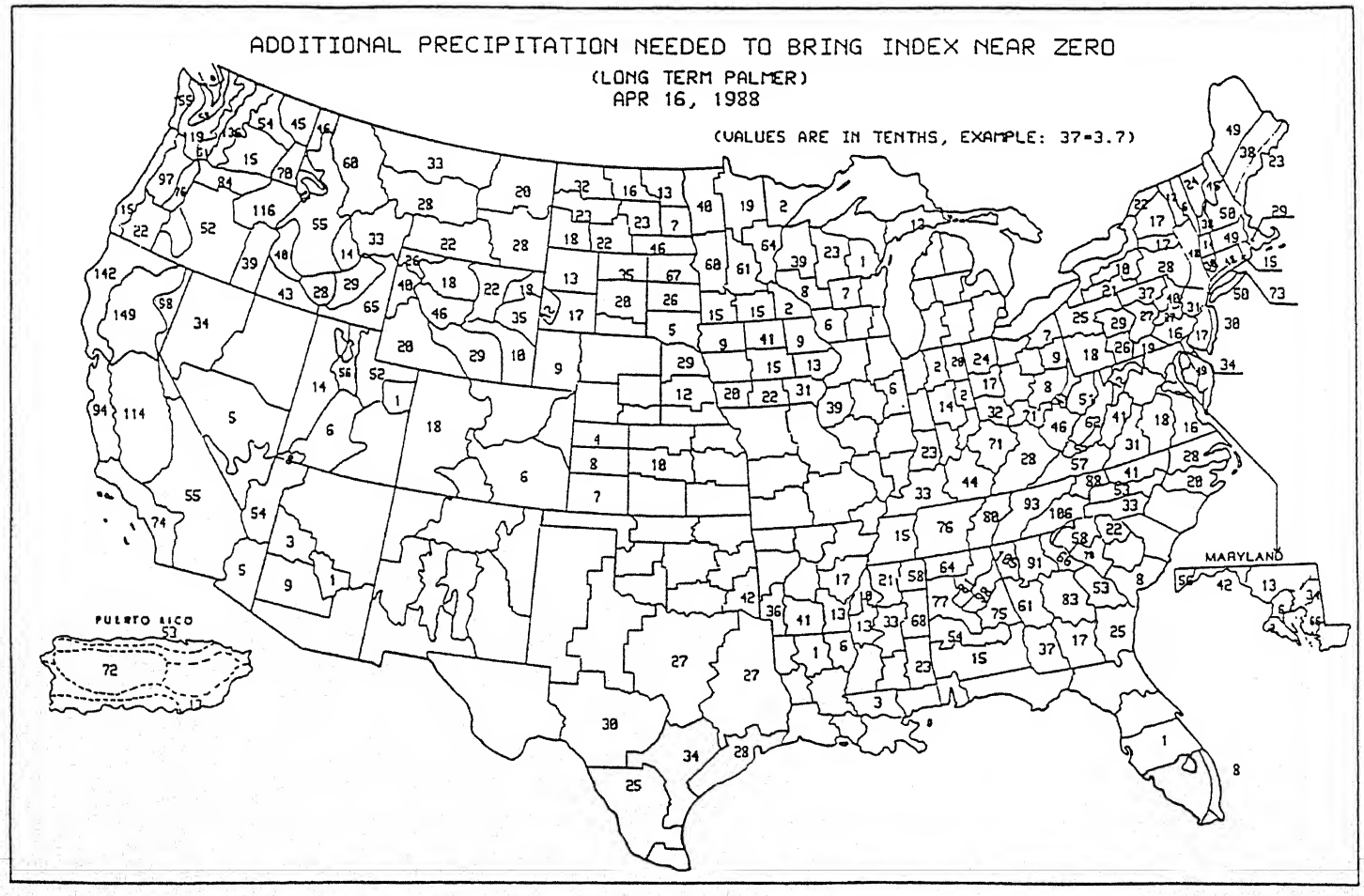


FIGURE 2. Additional precipitation needed to bring the Palmer Index near zero for the week ending April 16, 1988. Some climate divisions in the Southeast require between 8-11 inches, while other regions in the West need between 10-15 inches of excess precipitation to bring soil moisture conditions back to normal.

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC
National Weather Service, NOAA

RECENT PRECIPITATION HAS BROUGHT RELIEF TO SOME AREAS OF THE SOUTHEAST; HOWEVER, OTHER PORTIONS HAVE REMAINED ABNORMALLY DRY.

In the last few weeks, precipitation has generally increased at most stations in the Southeast. Previously, a large portion of the region, from northern Mississippi northeastwards into central Virginia, had received less than half their normal precipitation during the period of 1/24-3/26/88 (see Weekly Climate Bulletin dated 3/26/88) as deficits of six to eight inches were found in northern Alabama, central Tennessee, and western North Carolina.

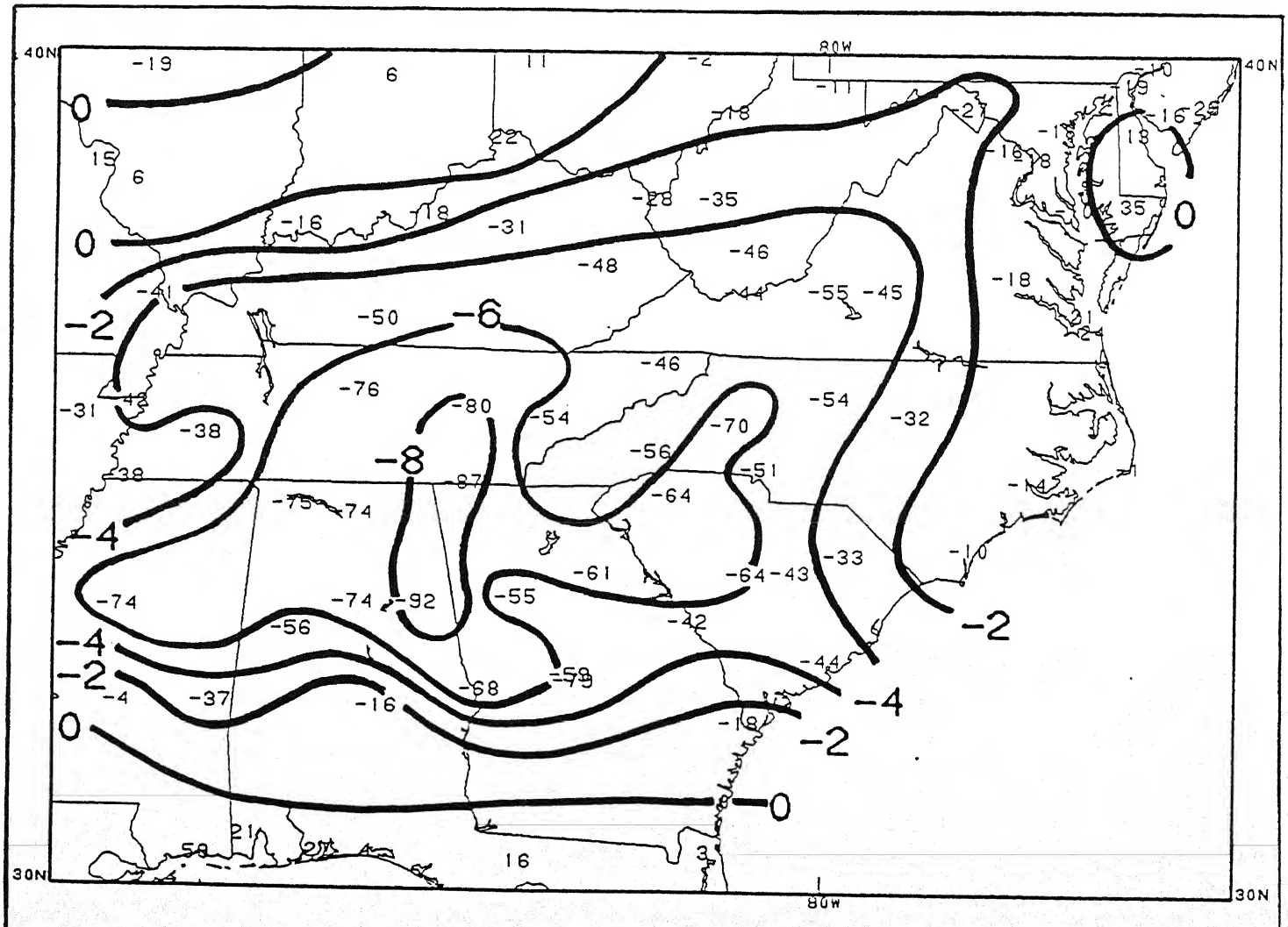


FIGURE 3. Departure from normal precipitation (in inches) during 1/24-4/16/88. While deficits along the Atlantic coast have recently decreased, deficiencies in central Tennessee and northern Alabama have continued increasing. Station values are in tenths (e.g. -74 = -7.4 inches).

The most recent storm system brought much-needed precipitation to eastern Tennessee, northern Georgia, and the Carolinas; however other areas reported light amounts, and deficiencies since January 24 have now exceeded nine inches in northern Alabama (see Figure 3). The regions of less than 50% of normal precipitation since 1/24/88 have decreased in the past few weeks (see Figure 4), but overall, long-term dryness and the additional precipitation needed to bring the Palmer Index near zero (see Figure 2 on page 14) have remained nearly constant. Substantial rainfall will be needed soon to ensure adequate short and long term soil moisture conditions during the current growing season.

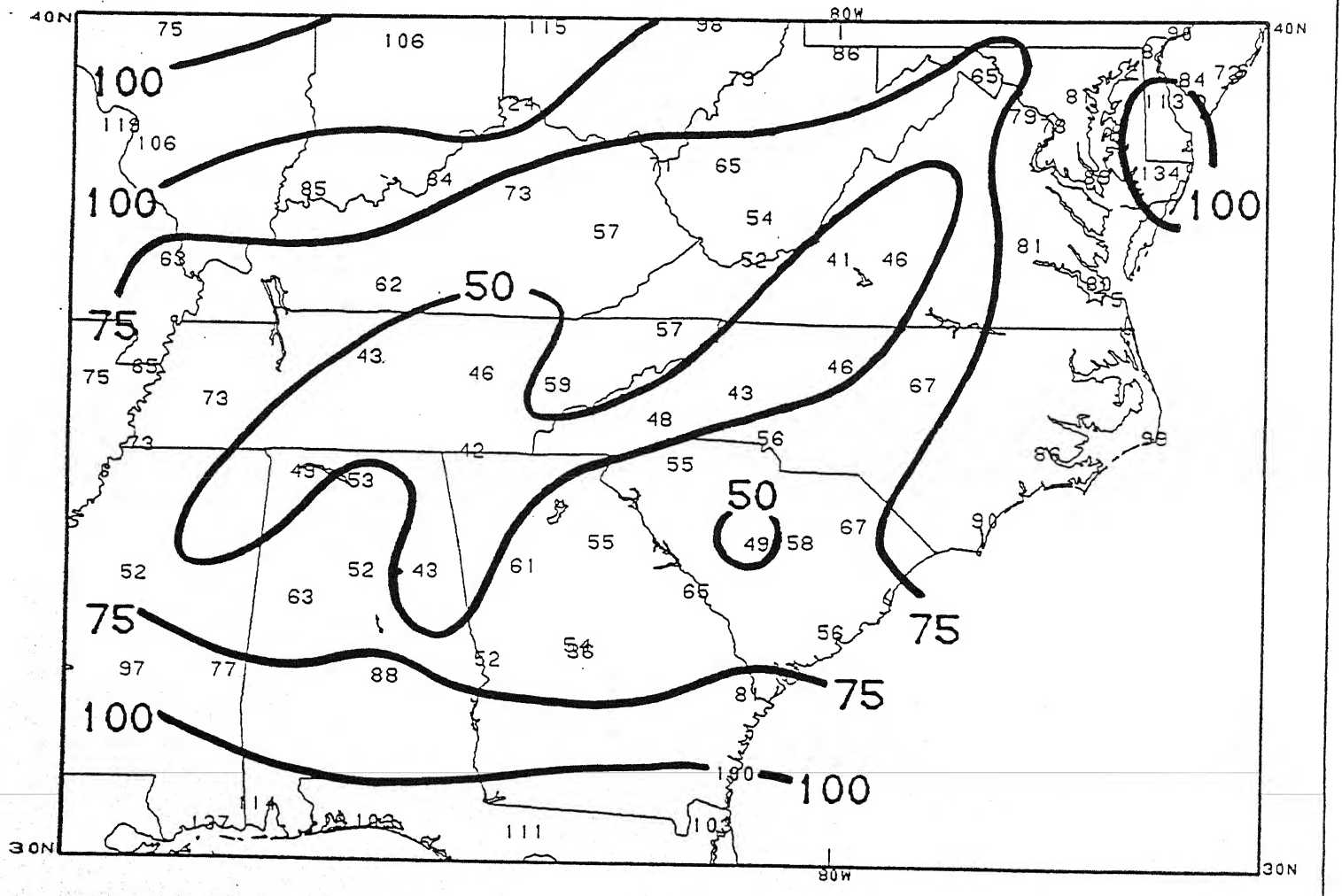


FIGURE 4. Percent of normal precipitation during 1/24-4/16/88. Values have generally increased in the past few weeks, but a large area with less than half the normal precipitation still exists.